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A NEW *CYMODOCELLA* FROM JAPAN (ISOPODA: SPHAEROMATIDAE)[1]

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With 5 Text-figures

Until quite recently, the flabelliferan isopod genus *Cymodocella* PFEFFER 1887 had been believed to be endemic to the Southern hemisphere. Seven species had been described as belonging to the genus: the best known type species *C. tubicauda* PFEFFER 1887 from the antarctic and antiboreal regions including South Georgia, Auckland, New Zealand and the coasts of Antarctica, four [*C. algoensis* (STEBBING 1875), *C. sublevis* BARNARD 1914, *C. pustulata* BARNARD 1914, and *C. cancellata* BARNARD 1920] from South Africa, one [*C. foveolata* MENZIES 1962] from Chile, and the last [*C. guaraparíensis* LOYOLA E SILVA 1965] from Brazil. In 1968, MILLER reported for the first time in the Northern hemisphere an occurrence of a specimen referable to *Cymodocella* from a buoy anchored in the coastal waters of the Bahamas, although he did not give any formal description of that specimen on account of its poor and immature condition.

For some years, the writer has been aware of the occurrence of a eubranchiate sphaeromatid with a characteristic tubular posterior extension of the pleotelson under stones and slabs on the coast of Hataké-jima, an islet located in the southern part of Tanabe Bay, near the Seto Marine Biological Laboratory. Examining a lot of specimens available to him, the writer has reached a conclusion that this sphaeromatid belongs to an undescribed species of *Cymodocella*. The purpose of the present paper is to describe this new species and to confirm the first definite record of the genus from the North Pacific.

The writer expresses his hearty thanks to Dr. T. TOKIOKA of the Seto Marine Biological Laboratory who kindly furnished him with a significant part of the material and critically read the manuscript.

Cymodocella nipponica NISHIMURA, n. sp.

(Jap. name: Tsutsuo-umisemi)

(Figs. 1–5)

MATERIAL EXAMINED: 1) 1♂ (holotype; 2.9 mm in body length), 10 immature ♂ (paratypes), 42 ♀ (all gravid; 1 allotype and 41 paratypes; 2.6–3.8 mm in body length).

1) Contributions from the Seto Marine Biological Laboratory, No. 501.

Hataké-jima Islet in Tanabe Bay, Kii Peninsula, Japan; coll. S. NISHIMURA; Mar. 28, 1967. Deposited at the museum of the Seto Marine Biological Laboratory (SMBL-Type 225). 2) 1 immature ♂, 38 ♀ (all gravid; 2.9–3.6 mm). Hataké-jima Islet; coll. Dr. T. TOKIOKA; Apr. 7, 1966. 3) 2 ♂ (3.1–3.3 mm), 12 immature ♂, 16 immature ♀, 11 juv. Hataké-jima Islet; coll. S. NISHIMURA; Oct. 3, 1968.

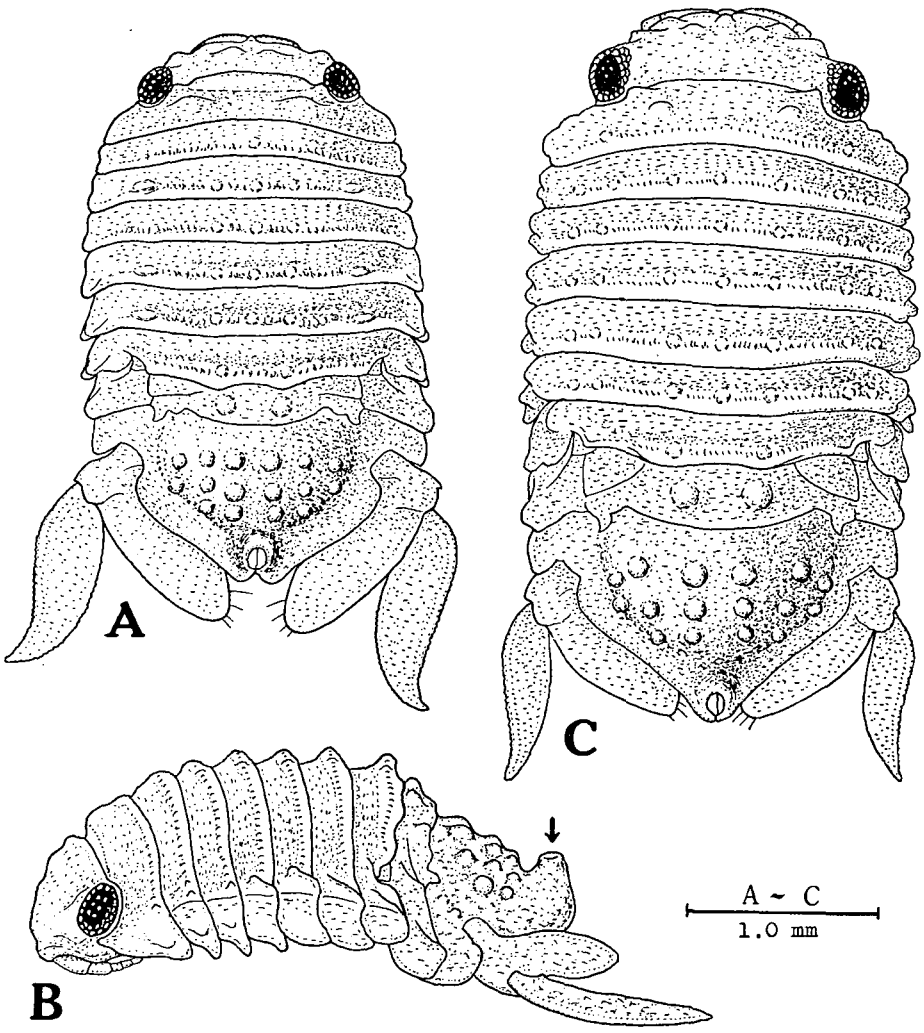

Fig. 1. *Cymodocella nipponica*, n. sp.
A—Holotype male, dorsal view. B—Same, lateral view; the arrow indicates the situation of the apical perforation of the tubular extension of pleotelson. C—Allotype female, dorsal view.

DIAGNOSIS: Body ovate, dorsally convex, very finely shagreened all over. Seventh pereonite not narrower than 6th, the posterior margin faintly bilobed.

Epimera not distinctly separated from pereonites, almost vertical. First pleonite partially concealed beneath 7th pereonite, 3rd pleonite not partaking in the posterior outline of pleon, 4th pleonite with 2 submedian dorsal tubercles. Pleotelson with 16 dorsal tubercles, 6 middle ones larger; lateral margins bent inward ventrally to form together a tube directed dorsally with an apical foramen. Each eye with ca. 25–30 ocelli. Basal segments of peduncle of 1st antennae are stout and expanded, slightly more than twice as long as 2nd which is also moderately stout, 3rd segment slender and slightly less than twice as long as 2nd. Maxilliped (Fig. 3B) with one coupling hook. Rami of penis (Fig. 3D) very long, more than 8 times as long as broad, united at base, in the proximal two-thirds furnished with minute spinules which tend to be clustered in the middle part. Male stylus (Fig. 5B) on 2nd pleopod extends for one-third of its own length beyond the the apex of endopod, its base broad, gradually tapering to a bluntly pointed tip. Both rami of 1st to 3rd pleopods thin and transparent, those of 4th and 5th pleopods fleshy and opaque with oblique respiratory plications. Exopods of 1st to 3rd pleopods not segmented, those of 4th and 5th pleopods incompletely 2–segmented. Exopod of 5th pleopod with squamiferous processes at the apex and on the inner margin. Uropods large, outer rami lamellar and lanceolate with a pointed apex, as long as inner rami which are lamellar with a round apex, both far extending beyond the posterior tip of pleotelson; margins of outer rami crenulated.

FURTHER DETAILS: *Male.*— Cephalon moderate, with a rostral process and sinuous frontal margins. First antenna reaching the posterior end of 1st pereonite; flagellum with 7–8 segments, as long as 1st and 2nd peduncular segments together. Second antenna reaching the posterior end of 3rd pereonite; flagellum with 11 segments, as long as peduncle.

Epistome (Fig. 2A) pentagonal, proximally narrow, widening rapidly and embracing the basal half of upper lip which is broader than long with distal margin rounded.

Lower lip (Fig. 3C) with lobes short, broad, and apically rounded.

Left mandible (Fig. 2D), incisor with 4 teeth and bidentate lacinia mobilis, to which are attached 2 pectinate setules. Right mandible (Fig. 2E), incisor also with 4 teeth and lacinia mobilis which is armed with ca. 2 pectinate setules proximally and 5–6 irregular dentate spinules distally. Molar processes are oblique and expanded. Mandibular palp 3–segmented, 1st and 2nd segments subequal in length, slightly less than twice as long as 3rd; distal 2 segments bear each pectinate setules on the outer margin, 5 on 2nd and 7 on 3rd.

First maxilla (Fig. 2F), inner lobe with 1 simple and 4 pectinate setules at the apex, outer lobe with ca. 5 teeth and 4 dentate spines at the apex.

Second maxilla (Fig. 3A), inner lobe with ca. 3 pectinate setules and 3–4 basally plumose setules at the apex, both lappets of outer lobe each with 4 dentate spines at the apex.

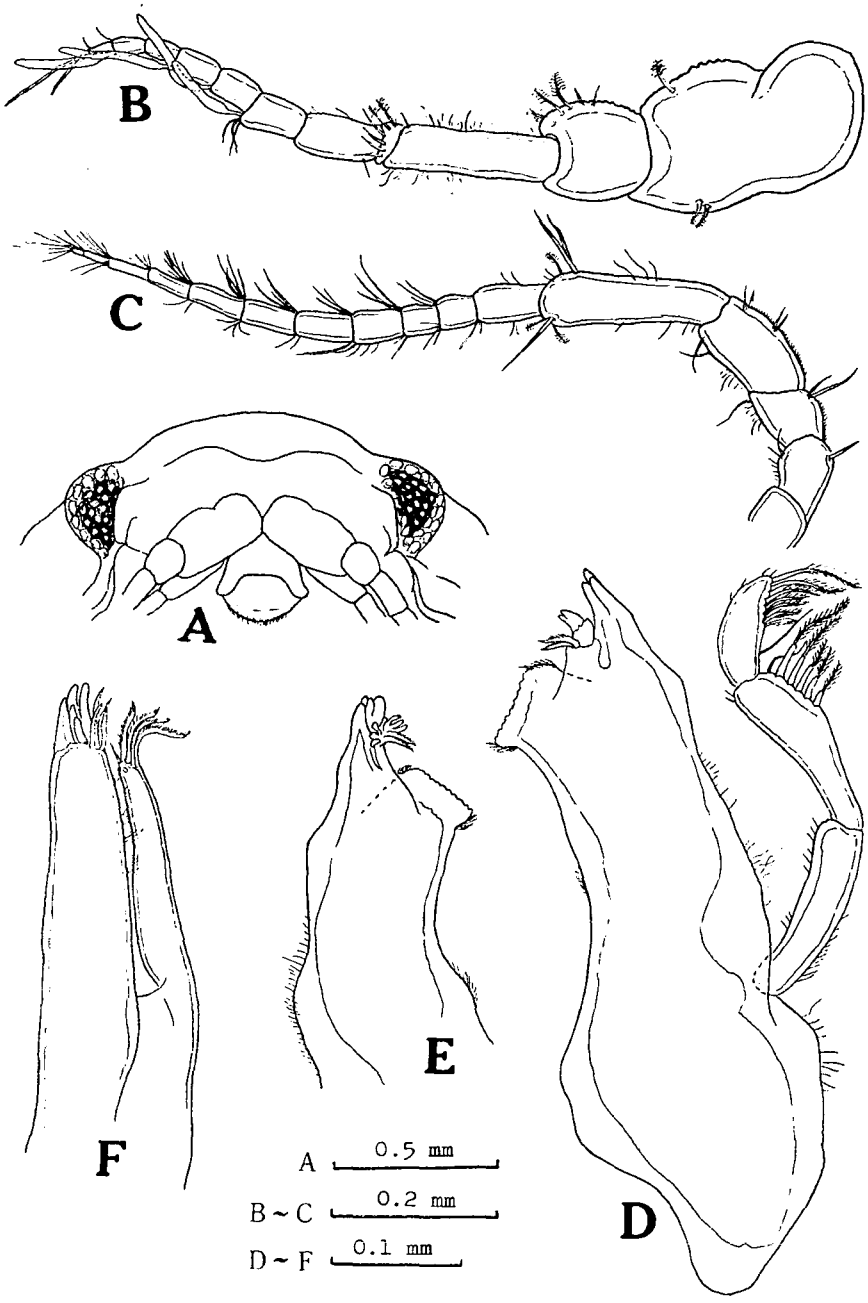

Fig. 2. *Cymodocella nipponica*, n. sp., male.
A—Front of cephalon, ventral view. B—First antenna. C—Second antenna. D—Left mandible. E—Right mandible, distal part. F—First maxilla.

Maxilliped (Fig. 3B), palp 5-segmented, slightly less than 1.5 times as wide as endite at the maximum, 2nd and 3rd segments provided each with a lobe, but 4th segment without any significant lobation. Endite extending beyond the distal end of 3rd segment of palp.

First pereopod (Fig. 4A), merus strongly produced and with 2 pectinate setules at the outer apex, inner apices of ischium, merus, carpus and propodus with 1 simple setule, 2 simple setules, 1 pectinate setule and 2 strong pectinate setules, respectively.

Second pereopod (Fig. 4B) longer and much more slender than 1st, the outer apex of merus produced but not so much as in 1st pereopod, outer apices of carpus and propodus with 1 plumose setule and 1 plumose and 1 simple setules, respectively, inner apices of ischium, merus, carpus and propodus with ca. 2, 1, 3 and 2 simple setules, respectively. No pectinate setules on 2nd pereopod.

Third pereopod (Fig. 4C) alike to, but somewhat stouter than 2nd.

Seventh pereopod (Fig. 4D) nearly as stout as 1st, merus slightly produced and with 1 plumose and 1 simple setules at the outer apex, with 2 simple setules at the inner apex, carpus with 2 pectinate setules and 1 plumose setule at the outer apex, 2 pectinate setules and 1 simple setule at the inner apex, propodus with 1 plumose and 1 simple setules at the outer apex, with 2 simple setules near the inner apex.

First to 3rd pleopods with 3–4 hooked, sometimes pectinate, setules at the inner apex of peduncle.

First pleopod (Fig. 5A), exopod with ca. 22 plumose setae on the distal and outer margins and 1 distally pectinate seta on the outer basal margin, endopod with ca. 15 plumose setae on the apical and outer margins, heavily ciliated on the inner margin.

Second pleopod (Fig. 5B), exopod with ca. 23 plumose setae on the distal and outer margins and 1 pectinate setule on the outer basal margin, endopod with ca. 15 plumose setae on the apical and outer margins, inner basal margin of male stylus lightly ciliated.

Third pleopod (Fig. 5C), exopod with ca. 27 plumose setae on the distal and outer margins, endopod with ca. 16 plumose setae on the apical and outer margins, heavily ciliated on the inner margin.

Fourth pleopod (Fig. 5D), exopod with ca. 4 simple and 5–6 minute setules on the outer margin, endopod with a hooked spinule at the apex.

Fifth pleopod (Fig. 5E), both rami with a few simple setules and many very minute cilia on the outer and distal margins.

Uropodal outer ramus very long, extending by far the tip of inner ramus, distally markedly recurved outward.

Female.— Somewhat larger than male. Dorsolateral edge of each pereonite provided with two conspicuous swells (this character is not so much pronounced in male). Lobation on the posterior margin of 7th pereonite weaker. Uropodal rami smaller and shorter than in male, tip of outer ramus not so markedly recurved. In other characters including the structure of oral and pereonal appendages, roughly similar to male.

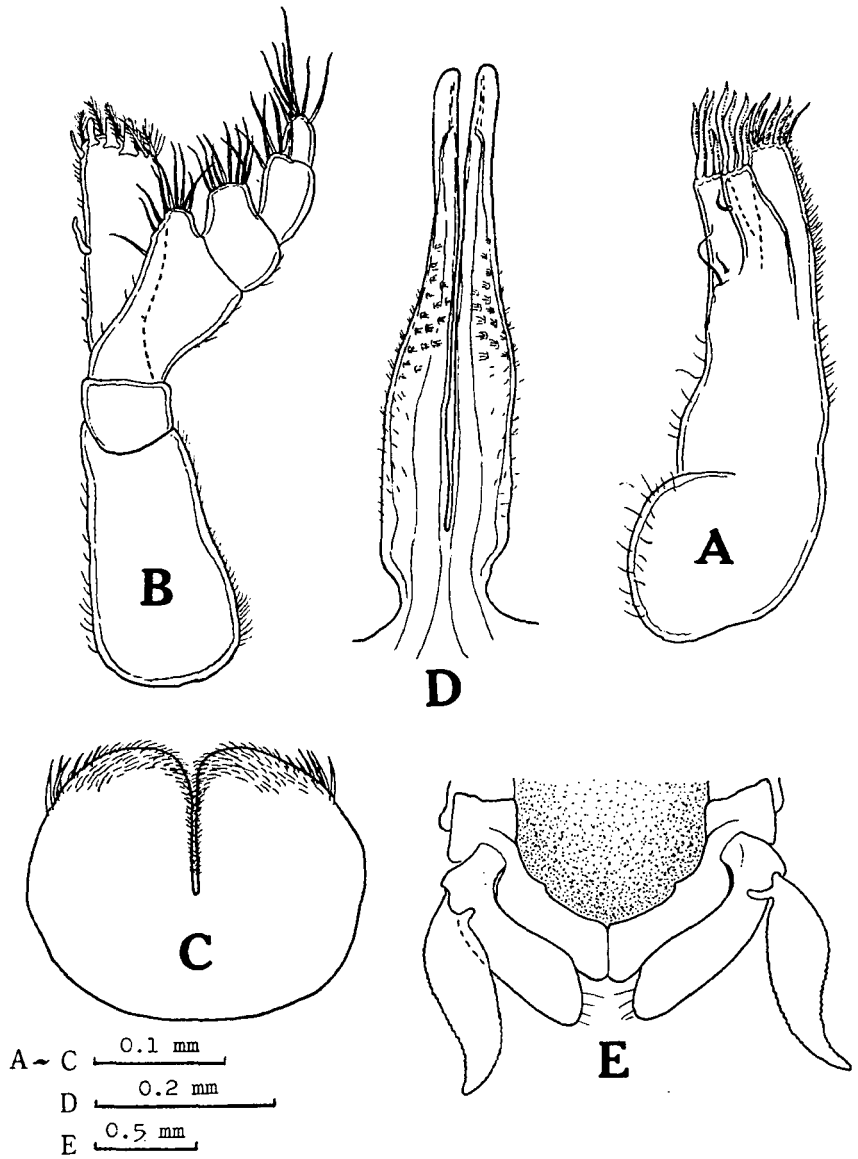

Fig. 3. *Cymodocella nipponica*, n. sp., male.
A—Second maxilla. B—Maxilliped. C—Lower lip. D—Penis. E—Posterior part of body, ventral view, pleopods omitted.

COLOR IN LIFE: Pale yellowish brown, with a red-orange tint on produced parts. Malanophores distributed on the dorsal surface; in females they are scattered all over, frequently more densely on the posterior border of each pereonite, in males

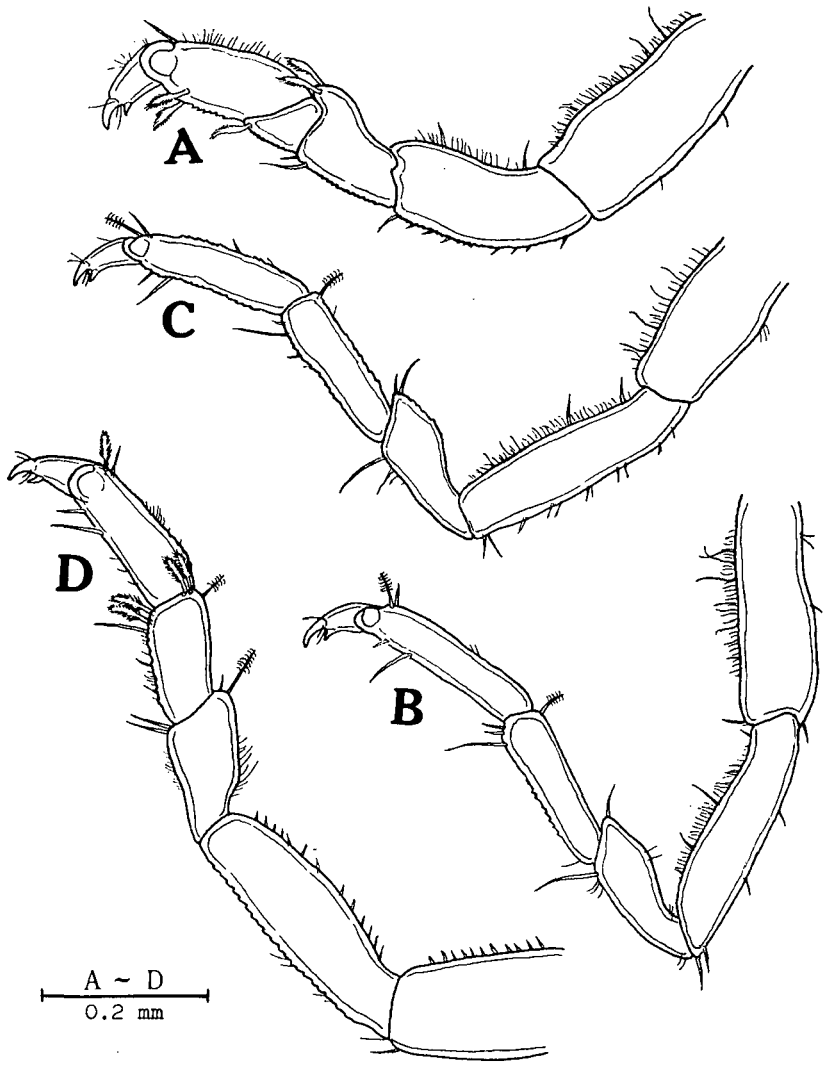

Fig. 4. *Cymodocella nipponica,* n. sp., male.
A—First pereopod. B—Second pereopod. C—Third pereopod. D—Seventh pereopod.

they are aggregated to form more or less conspicuous patches on cephalon, median parts of 1st to 4th pereonites, pleon and sublateral parts of pleotelson. A melanophore blotch on the central part of uropodal inner ramus. Guanin patches sometimes present. Eyes black.

MEASUREMENTS OF TYPES:

	Holotype ♂	Allotype ♀
Body length	2.9 mm	3.8 mm
Body width	1.8 mm (at 2nd pleonite)	2.3 mm (at 5th pereonite)
Pleotelson length (PL)	0.95 mm	1.1 mm
Pleotelson width	1.7 mm	2.0 mm
Uropodal outer ramus length (UL)	1.1 mm	1.0 mm
Uropodal outer ramus width (UW)	0.31 mm	0.27 mm
UL/PL	1.1	0.92
UW/PL	0.33	0.24

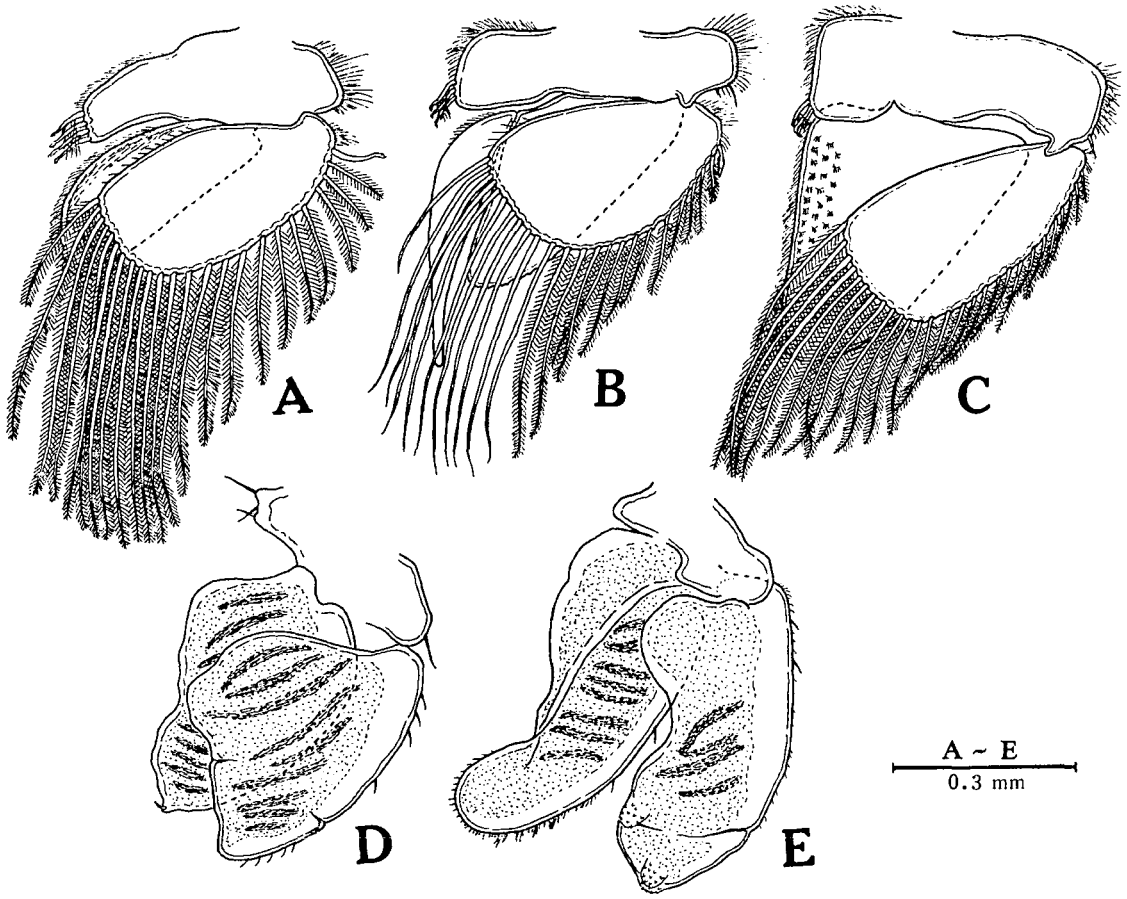

Fig. 5. *Cymodocella nipponica*, n. sp., male.
A—First pleopod. B—Second pleopod. C—Third pleopod. D—Fourth pleopod. E—Fifth pleopod. Marginal setae on endopod are all omitted in A to C; cilia on some exopodal marginal setae also omitted in B.

ECOLOGICAL NOTES: The present new species lives in somewhat protected places in the upper intertidal zone of the exposed rocky shore, frequently found more or less aggregated under stones or slabs in the completely dried habitat at low tide. It is interesting that females were much more abundant than males in early spring, when all females were gravid. The sample collected in autumn, on the other hand, contained roughly the same number of males and females, and no females were gravid. This may suggest that males will die in winter after copulation but females will survive to next late spring or summer when they release youngs and die. The fact that females are slightly larger than males may be taken to support this idea.

The four gravid females dissected, 3.6, 3.4, 3.3 and 2.8 mm in body length, were found incubating 34 eggs, 23 early embryos, 24 eggs and 16 early embryos, respectively. The eggs measured 0.40–0.45 mm in diameter.

Sometimes, a kind of long filamentous alga, probably a blue-green alga, was found growing over the dorsal surface of the animal, especially in its posterior part; occasionally the algal growth was considerably thick. Among the 53 isopods collected on Mar. 28, 1967, a single female was found attached by 3 polyps of a filiferan athecate hydroid on the pleon and pleotelson. The polyps were small, only 0.5 mm tall, and provided with ca. 12 filiform tentacles.

REMARKS: The present new species is quite distinct from all the species of the genus known from the Southern hemisphere in the following points: 1) seventh pereonite is *not* narrower than the preceding ones; 2) exopod of 5th pleopod is *not* completely segmented; 3) uropodal rami are *not* small, *not* falling in short of pleotelsonal apex; 4) uropodal outer ramus is *not* much shorter than inner ramus; 5) uropodal outer ramus is *not* rounded *nor* truncated at the apex.

MILLER's (1968) *Cymodocella* sp. from the Bahamas is not only known insufficiently but also shows several aberrant characters so that it may scarcely be significant at present to compare it taxonomically with the present species; however, the shape and size of uropodal rami, at least, appear to be markedly different between the two forms.

The present new species resembles most closely "*Dynamenopsis dumerili*" of MONOD (1933) reported from the northern Red Sea. These two species share all of the above five characters; in addition, their habitats are quite similar. However, the present species is distinguishable from MONOD's "*Dynamenopsis dumerili*" in the following points: 1) seventh pereonite is bilobed rather than smooth on the posterior margin; 2) pleotelson bears more tubercles on the dorsal surface (16 versus 12); 3) uropodal inner ramus is round rather than angular at the apex; 4) male uropodal outer ramus is distally recurved outward rather than straight to a pointed end; 5) tip of male stylus is simply blunt rather than pointed and provided with a spinule; etc.

It seems that MONOD's (*l. c.*) species is far from BAKER's (1908) *obtusa*, the type species of the genus *Dynamenopsis* BAKER 1908 described from South Australia; rather it shows a closer affinity with the present new species.

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